Welch Allyn

Service Manual

Tycos®

Aneroid Sphygmomanometers

PN 95P504 Rev A
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Revision History

Revision	Section	Date	Author	Description
A	All	8/31/00	JDB	Introduction of Aneroid Service Manual

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Section 1: General Information

1.1 To Service Personnel

The information contained in this manual is subject to change without notice and should not be construed as commitment by Welch Allyn Inc.

Welch Allyn Inc. assumes no responsibility for any errors that may appear in this manual. If the product and/or its operation varies significantly from any description herein, please contact the

Welch Allyn Inc. Technical Service Center
800-450-9275
(828) 684-4895
Fax (828) 687-1002

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USA

This product has been designed to provide a high degree of safety and reliability. However, Welch Allyn Inc. can not guarantee against: deterioration of components due to aging, normal wear, tampering, and abuse.

Warning: If in the course performing calibration or repair on the gauge the device becomes inoperable and must be sent in to the Welch Allyn Inc. Service Center, The warranty will ***not*** be honored and you will be charge for all repairs.

1.2 Tools and Equipment

The following is a list of the tools and equipment that is required to do the repair and calibration of the aneroid gauges.

Tool Number	Description
T106845A	Calibration Tool
T105243A	Pointer Removal Tool
T105243B	Pointer Removal Tool
T107345	Span Wrench
T110657	Calibration Dial Adapter, Economy
T105721	Calibration Dial, Pocket and Hand Gauge
T112663	Calibration Dial, Walls and Mobiles
T106763	Calibration Stand (Wall Aneroid)
T112592	Calibration Dial (Silver Ring)
T105258	Wrench (Economy)
T108913	3/8” Open End Wrench
T108897	Movement Removal Wrench
T113265	Thumbscrew Wrench
T110543	Pliers to Grip Lure
T105644	Collet
T55804-1	Pocket Screw Cap Assembly
T108212	Economy Fixture
T107569	Hand Fixture
T74555	Pocket Fixture
T112655	Top Plate Wrench
T113249	Screw Cap Removal Tool
T112927	5/16” Open End Wrench
T112765	¼” Open End Wrench
T34938	Pointer Block
T112511B	Tweezers
T112726	Jewelers Screw Driver
T112595	Calibration Tool (Silver Ring)
“Disytest”	Calibration Dial for Pro Check (Order From S+K)
T112833	Movement Removal Tool (S+K Movement)
T112653	Torque Wrench (S+K movement)
T112653A	Adapter for Torque wrench (S+K Movement)

Test Equipment	Description
5088-01	Bulb and Valve
T112854	500cc Volume
9585TPK4	“T” Fitting
9586TPK4	“Y” Fitting
97P24	Pneumatic Tubing (4ft.)
200-2000IN	Netech Digital Pressure Meter
“or”	
2270-01	Setra Digital Pressure Meter.
T111962A	Tension Set Tool
T112459	Torque Screwdriver
T112459A	Torque bit.

Other Tools Needed but Not Provided By Welch Allyn

1. Small Hammer
2. 5/8” Socket
3. ½” Socket
4. ¾” Open End Wrench
5. 9/16” - 24 Thread Tap
6. ¼” - 40 Thread Tap
7. 7/16” - 36 Thread Tap

1.3 Test Specifications

The following are the test specification for the Welch Allyn Tycos Aneroid Gauge:

1. The gauge will be accurate to within +/- 3 mmHg* at the following test pressures:
    a) 0 mmHg (pointer inside the oval/rectangle)
    b) 60 mmHg
    c) 150 mmHg
    d) 200 mmHg
    e) 300 mmHg

* This accuracy is based on the use of a calibrated digital pressure meter. If using a calibrated aneroid or mercury column for measuring the accuracy of the aneroid in question the resulting accuracy is +/- 6 mmHg.

1.4 Test Equipment Bench Layout

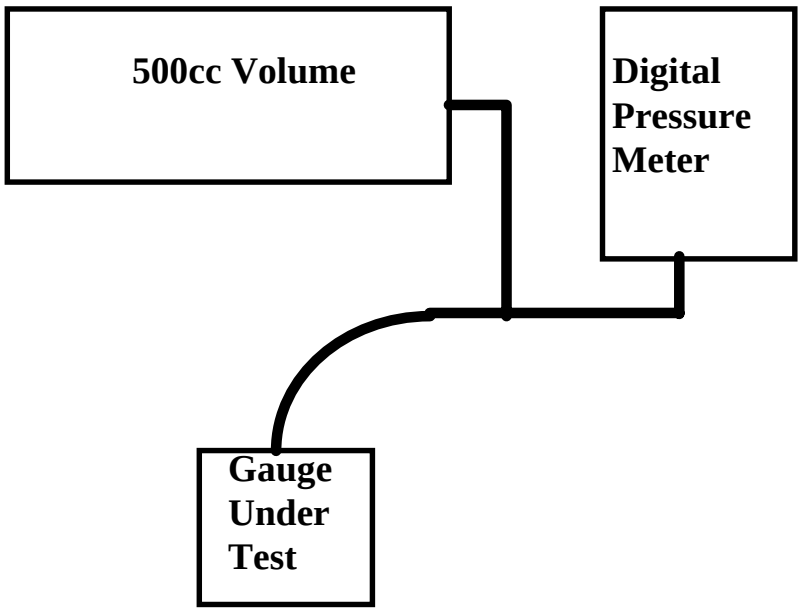


Figure 1.5

Section 2: Classic Pocket Aneroid Gauges

*2.1 Opening/Removing and Replacing Parts of the Pocket Gauge**

1. Place the pocket gauge into the Pocket Gauge Fixture (T74555).
2. Remove the bezel by unscrewing it from the case and aside. Remove the crystal and aside.
3. Remove the pointer by using the pointer removal tool (T105243A).
4. Pry out the dial by using a small flat head screwdriver.
5. Remove the locking nut using the span wrench (T107345).
6. Remove the screw cap using (T113249) and remove the capsule. ***Note:*** *the arm of the movement fits into the top of the capsule.*
7. Remove the 2 screws that are holding down the gauge movement using T108897 and remove the movement.

Reassemble in reverse order.

* - See section 8.1 for exploded view drawing for the Pocket Gauge.

2.2 Calibration of the Pocket Gauge

1. Attach the pneumatic tubing of test equipment to the gauge.
2. Place gauge in to fixture (T74555)
3. Remove bezel, crystal, pointer and dial.

To set the tension:

4. Tighten all screws.
5. View sector gear and ensure proper position (i.e. right edge of sector gear should align with mark on base of movement).
6. If sector gear not aligned properly, loosen the capsule nut using a 3/8" wrench and adjust the sector gear by turning the capsule until sector gear is in correct position per step 5. Tighten capsule nut.
7. Loosen sector stop lug and pull toward bottom of gauge.
8. Using your left index finger, push the sector gear all the way to the post and hold that in position.
9. Place tension setting tool (T119628) onto pinion at the 9 o'clock position.
10. Rotate tool clock wise to the 3 o'clock position.
11. Release sector gear and continue rotation to the 6 o'clock position sector gear should be moving during this step).
12. Bring lug back to correct position and lock into place.

To set the span:

13. Place Test Dial onto gauge. Place pointer onto pinion. Rotate dial until pointer is at "0" at the bottom of the gauge.
14. Apply 320 mmHg to the Gauge.
15. Release pressure to 300 mmHg to the gauge.
16. If point is less than 300, Place the calibration tool (T106854A) into the radius plate in slot above screw. Pull calibration tool toward bottom of gauge moving the sector gear upward until pointer reached "300." Release pressure and check "0" point.
17. If point is greater than 300, Using the calibration tool (T106845A) positioned between the sector gear and radius plate on the left of the movement, rotate the tool clock wise until pointer is at "300" (this brings the radius plate down). Release pressure and check "0" point.
18. If not at "0" upon release of pressure, rotate test dial until pointer is on the "0" mark of test dial and re-apply 300 mmHg. Repeat steps 14-17 until span is set.
19. Check for leak by pinching off the tubing from the test equipment while pressure is on the gauge. There should be no visible leak.

Check and finish calibration:

20. Remove the pointer and test dial, replace the gauge's dial.
21. Place pointer onto pinion and resting in center of oval. Tap pointer with small hammer slightly to secure.
22. Apply 320 mmHg to the gauge.
23. Release pressure to 300 mmHg and take readings here and at given points (see section 1.3).
24. If pointer is greater than 300, pull pointer until you feel slight resistance counter-clock wise, tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
25. If less than 300, rotate pointer 1 complete revolution clockwise until resistance is felt. Push pointer a little farther and tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
26. Place crystal and bezel back onto gauge and check.

- Please see Section 8.8 for a drawing of the Welch Allyn Tycos Movement.

2.3 Testing

1. Hook up the Pocket Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauges.
3. Release the pressure to 300 mmHg on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Pocket Gauge under test. Refer to section 1.3 for specifications.

Section 3: Classic Hand Aneroid Gauge

*3.1 Opening/Removing and Replacing Parts of the Hand Gauge**

1. Pull bulb off of valve body (48S95).
2. Place the Hand Gauge into the Hand Gauge Fixture (T107569).
3. Remove the bezel by unscrewing it from the case and aside. Remove the crystal and aside.
4. Remove the pointer by using the pointer removal tool (T105243A).
5. Pry out the dial by using a small flat head screwdriver.
6. Remove the cover of the Hand Gauge by unscrewing the two screws (9P2651) with a Phillips head screwdriver.
7. Loosen the locking nut (32P527) from the capsule and remove both from the case.
8. Remove the 9P1799 screws from the case and movement and remove the movement from the case.
9. Remove the Thumbscrew by using tool # T113265 (Thumbscrew wrench) and turning the thumbscrew counter-clock wise.
10. Remove the Thumbscrew valve body (42P252) using a 5/8” socket.
11. Remove the valve body (48S95) from the case using a 1/2” socket.

Reassemble in reverse order

* - See section 8.2 for an exploded view drawing of the Hand Gauge.

3.2 Calibration of the Hand Gauge

1. Attach the pneumatic tubing of test equipment to the gauge.
2. Ensure that the valve of the gauge is closed. Place gauge in to fixture (T107569)
3. Increase pressure on the gauge to 250 mmHg. Allow the pressure to stabilize for 15 seconds. Check leak and ensure that the leak is no greater than 3 mmHg in 15 seconds.
4. Remove bezel, crystal, pointer and dial.

To set the tension:

5. Tighten all screws.
6. View sector gear and ensure proper position (i.e. right edge of sector gear should align with mark on base of movement).
7. If sector gear not aligned properly, loosen the capsule nut using a 3/8" wrench and adjust the sector gear by turning the capsule until sector gear is in correct position per step 5. Tighten capsule nut.
8. Loosen sector stop lug and pull toward bottom of gauge.
9. Using your left index finger, push the sector gear all the way to the post and hold that in position.
10. Place tension setting tool (T119628) onto pinion at the 9 o'clock position.
11. Rotate tool clock wise to the 3 o'clock position.
12. Release sector gear and continue rotation to the 6 o'clock position sector gear should be moving during this step).
13. Bring lug back to correct position and lock into place.

To set the span:

14. Place Test Dial onto gauge. Place pointer onto pinion. Rotate dial until pointer is at "0" at the bottom of the gauge.
15. Apply 320 mmHg to the Gauge.
16. Release pressure to 300 mmHg to the gauge.
17. If point is less than 300, Place calibration tool (T106845A) into the radius plate in slot above screw. Pull calibration tool toward bottom of gauge moving the sector gear upward until pointer reached "300." Release pressure and check "0" point.
18. If point is greater than 300, Using the calibration tool (T106845A) positioned between the sector gear and radius plate on the left of the movement, rotate the tool clock wise until pointer is at "300" (this brings the radius plate down). Release pressure and check "0" point.
19. If not at "0" upon release of pressure, rotate test dial until pointer is on the "0" mark of test dial and re-apply 300 mmHg. Repeat steps 14-17 until span is set.

Check and finish calibration:

20. Remove the pointer and test dial, replace the gauge's dial.
21. Place pointer onto pinion and resting in center of oval. Tap pointer with small hammer slightly to secure.
22. Apply 320 mmHg to the gauge.
23. Release pressure to 300 mmHg and take readings here and at given points (see section 1.3)
24. If pointer is greater than 300, pull pointer until you feel slight resistance counter-clock wise, tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
25. If less than 300, rotate pointer 1 complete revolution clockwise until resistance is felt. Push pointer a little farther and tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
26. Place crystal and bezel back onto gauge and check.

- Please see section 8.8 for drawing of Welch Allyn Tycos movement.

3.3 Testing

1. Hook up the Hand Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauge.
3. Release the pressure to 300 mmHg. on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Hand Gauge under test. Refer to section 1.3 for specifications.

Section 4: Classic Wall and Mobile Aneroid Gauge

*4.1 Opening/Removing and Replacing Parts of the Wall and Mobile Gauge.**

7670 series Wall and Mobile Aneroid.

1. Remove the bezel from the case by prying the 4 tabs up and pulling out on the bezel.
2. Remove the crystal and aside.
3. Remove the pointer by using the pointer removal tool (T105243B) visually inspect, straighten and aside.
4. Remove the screws of the dial by using the torque driver (T112459) and remove the dial and aside.
5. Remove the screws that are holding down the mount to the case of the gauge by using a Phillips head screwdriver.

Reassemble in reverse order

* - See section 8.3 for exploded view drawing of 7670 Series Wall and Mobile Aneroid.

Classic Wall and Mobile Aneroid.

1. Remove crystal by pushing down and out at the top. Set crystal aside.
2. Remove pointer by using the pointer removal tool (T105243B). Inspect, straighten and aside pointer.
3. Remove the dial by removing the screws with the torque driver (T112459) and aside.
4. Remove the movement and the mount by unscrewing the standoffs and removing them from the case.

Reassemble in reverse order

* - See section 8.4 for exploded view drawing of the Classic Wall and Mobile Aneroid.

4.2 Calibration of the Wall and Mobile Gauge

1. Attach the pneumatic tubing of test equipment to the gauge.
2. Remove bezel, crystal, pointer and dial.

To set the tension:

3. Tighten all screws.
4. View sector gear and ensure proper position (i.e. right edge of sector gear should align with mark on base of movement).
5. If sector gear not aligned properly, loosen the capsule nut using a 3/8" wrench and adjust the sector gear by turning the capsule until sector gear is in correct position per step 5. Tighten capsule nut.
6. Loosen sector stop lug and pull toward bottom of gauge.
7. Using your left index finger, push the sector gear all the way to the post and hold that in position.
8. Place tension setting tool (T119628) onto pinion at the 9 o'clock position.
9. Rotate tool clock wise to the 3 o'clock position.
10. Release sector gear and continue rotation to the 6 o'clock position sector gear should be moving during this step).
11. Bring lug back to correct position and lock into place.

To set the span:

12. Place Test Dial onto gauge. Place pointer onto pinion. Rotate dial until pointer is at "0" at the bottom of the gauge.
13. Apply 320 mmHg to the Gauge.
14. Release pressure to 300 mmHg to the gauge.
15. If point is less than 300, Place calibration tool (T106845A) into the radius plate in slot above screw. Pull calibration tool toward bottom of gauge moving the sector gear upward until pointer reached "300." Release pressure and check "0" point.
16. If point is greater than 300, Using the calibration tool (T106845A) positioned between the sector gear and radius plate on the left of the movement, rotate the tool clock wise until pointer is at "300" (this brings the radius plate down). Release pressure and check "0" point.
17. If not at "0" upon release of pressure, rotate test dial until pointer is on the "0" mark of test dial and re-apply 300 mmHg. Repeat steps 14-17 until span is set.
18. Check for leak by pinching off the tubing from the test equipment while pressure is on the gauge. There should be no visible leak.

Check and finish calibration:

19. Remove the pointer and test dial, replace the gauge's dial.
20. Place pointer onto pinion and resting in center of oval. Tap pointer with small hammer slightly to secure.
21. Apply 320 mmHg to the gauge.
22. Release pressure to 300 mmHg and take readings here and at given points (see section 1.3)
23. If pointer is greater than 300, pull pointer until you feel slight resistance counter-clock wise, tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
24. If less than 300, rotate pointer 1 complete revolution clockwise until resistance is felt. Push pointer a little farther and tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
25. Place crystal and bezel back onto gauge and check.

- Please see section 8.8 for a drawing of the Welch Allyn Tycos Movement

4.3 Testing

1. Hook up the Wall or Mobile Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauge.
3. Release the pressure to 300 mmHg on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Wall or mobile gauge under test. Refer to section 1.3 for specifications.

Section 5: Economy Aneroid Gauge

*5.1 Opening/Removing and Replacing Parts of the Economy Gauge**

1. Remove the two screws from the back of the case using a Phillips head screwdriver. Aside the screws and the clip.
2. Remove the Economy cover an d crystal and aside.
3. Remove the pointer using the pointer removal tool (T105243B). Inspect, straighten and aside the pointer
4. Pry the dial from the case using a small flat head screwdriver.
5. Remove the movement from the case using T108897 and aside.
6. Loosen screw from the case using T105258 and remove the capsule.

Reassemble In reverse Order

* - See section 8.5 for exploded view drawing for the Economy Aneroid.

5.2 Calibration of the Economy Gauge

1. Attach the pneumatic tubing of test equipment to the gauge.
2. Place gauge in to fixture (T108212)
3. Remove bezel, crystal, pointer and dial.

To set the tension:

4. Tighten all screws.
5. View sector gear and ensure proper position (i.e. right edge of sector gear should align with mark on base of movement).
6. If sector gear not aligned properly, loosen the capsule nut using wrench (T105258) and adjust the sector gear by turning the capsule until sector gear is in correct position per step 5. Tighten capsule nut.
7. Loosen sector stop lug and pull toward bottom of gauge.
8. Using your left index finger, push the sector gear all the way to the post and hold that in position.
9. Place tension setting tool (T119628) onto pinion at the 9 o'clock position.
10. Rotate tool clock wise to the 3 o'clock position.
11. Release sector gear and continue rotation to the 6 o'clock position sector gear should be moving during this step).
12. Bring lug back to correct position and lock into place.

To set the span:

13. Place Test Dial onto gauge. Place pointer onto pinion. Rotate dial until pointer is at "0" at the bottom of the gauge.
14. Apply 320 mmHg to the Gauge.
15. Release pressure to 300 mmHg to the gauge.
16. If point is less than 300, Place calibration tool (T106845A) into the radius plate in slot above screw. Pull calibration tool toward bottom of gauge moving the sector gear upward until pointer reached "300." Release pressure and check "0" point.
17. If point is greater than 300, Using the calibration tool (T106845A) positioned between the sector gear and radius plate on the left of the movement, rotate the tool clock wise until pointer is at "300" (this brings the radius plate down). Release pressure and check "0" point.
18. If not at "0" upon release of pressure, rotate test dial until pointer is on the "0" mark of test dial and re-apply 300 mmHg. Repeat steps 14-17 until span is set.
19. Check for leak by pinching off the tubing from the test equipment while pressure is on the gauge. There should be no visible leak.

Check and finish calibration:

20. Remove the pointer and test dial, replace the gauge's dial.
21. Place pointer onto pinion and resting in center of oval. Tap pointer with small hammer slightly to secure.
22. Apply 320 mmHg to the gauge.
23. Release pressure to 300 mmHg and take readings here and at given points (see section 1.3)
24. If pointer is greater than 300, pull pointer until you feel slight resistance counter-clock wise, tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
25. If less than 300, rotate pointer 1 complete revolution clockwise until resistance is felt. Push pointer a little farther and tap pointer with small hammer and recheck. Make sure pointer returns to the oval each time. Repeat until satisfied.
26. Place crystal and bezel back onto gauge and check.

- Please see section 8.8 for a drawing of the Welch Allyn Tycos Movement

5.3 Testing

1. Hook up the Economy Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauge.
3. Release the pressure to 300 mmHg on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Economy gauge under test. Refer to section 1.3 for specifications.

Section 6: Silver Ring Hand Aneroid

6.1 Opening/Removing and Replacing Parts of the Silver Ring

1. Unscrew the bulb from the gauge.
2. Place screwdriver under the bezel in the opening provided and lift bezel.
3. Place screwdriver under the crystal in the opening provided and lift the crystal.
4. Using the T105243A pointer removal tool, remove the pointer from the pinion.
5. Remove the dial from the housing.
6. Remove the movement using T112833 movement removal tool.
7. Remove the movement internal housing.
8. Remove the valve body-trigger module.

Reassemble in reverse order (Ensure you tighten the movement down with Torque wrench T112653 using adapter T112653A)

* - See section 8.6 for drawing of the Silver Ring Gauge.

6.2 Calibration of the Silver Ring Hand Aneroid

1. Obtain gage assembly, attach air supply with luer fitting
2. Position test dial and test pointer on gage.
3. Apply 300 mmHg pressure. View gauge and ensure the leak is no greater than 10 mmHg in 5 seconds.

SPAN ADJUSTMENT

From average "0" starting position, pressure gage to 320 then down to 300 mmHg. Note position and maintain pressure:

1. If span is too low - obtain tweezers or jewelers screwdriver and bend the adjustment pin away from pinion parallel to gear sector arm. Change pressure to 0, make sure to re-adjust the test dial so that the pointer will be slightly left of the graduation line. Re-pressurize to 320 then to 300 to evaluate effects of adjustment.
2. If span is too high - obtain tweezers or jewelers screwdriver and bend the adjustment pin towards the pinion parallel to the gear sector when pressurized at 300. Change pressure to 0, make sure to re-adjust the test dial so that the pointer will be slightly left of the graduation line. Re-pressurize to 320 then to 300 to evaluate effects of adjustment.
3. Repeat above steps as required to obtain correct span adjustment.

LINEARITY ADJUSTMENT - (As required) If 0 and 300 position are correct, and other points at 250, 200, 150, 100 or 60 are either too high or too low at one or more points, then perform the following adjustments.

HIGH GAGE READINGS - (Predominantly at 250 and 200)

1. Remove test pointer and test dial. Obtain calibration tool and position over adjusting pin down to cross shaft, (move gear sector with finger of other hand to allow access). Rotate pin to move hook away from diaphragm approx. 15 degrees. While maintaining this position, lift tool up from cross shaft approx. 1/16 inch and bend the pin back towards the operator approx. 15 degrees. Lift the calibration tool up to the point where the pin makes contact with the gear sector and bend the pin up, (away from operator) approx. 30 degrees.
2. Remove tool and release gear sector. The resultant bend should result in the gear sector starting position being a max. of 2 teeth extending beyond the top plate when viewed from a top position and a minimum of 2 teeth within the edge of the top plate. (This must be checked by pushing the gear sector 2 teeth from the other side of the top plate). Adjust secondary bend if gear sector is out of these limits. Re-assemble test dial and pointer, recheck span and adjust as necessary prior to inspection at intermediate points.

LOW GAGE READINGS - (Predominantly at 60 and 100)
1. Remove test pointer and test dial. Obtain calibration tool and position over adjusting pin down to cross shaft. Lift tool approx. 1/16 inch and bend the pin away from operator approx. 15 degrees. While maintaining this position, lift tool to point where pin makes contact with the gear sector. Bend the pin down or towards the operator approx. 30 degrees. Remove tool and release gear sector. Check for gear sector starting position as defined previously, adjust if necessary. Re-assemble test dial and pointer, recheck span and adjust as necessary prior to inspection at intermediate points.
NOTE: In all adjustments during calibration, the gear sector starting position will affect accuracy. Sometimes, this alone can be used as an individual adjustment to achieve conformance. Higher readings will be realized when the gear sector is extending beyond the edge of the top plate and lower readings will be realized when it is within the edge of the top plate.

- - See Section 8.9 for drawing of the S+K Movement.

6.3 Testing of the Silver Ring Hand Aneroid

1. Hook up the Silver Ring Hand Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauge.
3. Release the pressure to 300 mmHg on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Silver Ring Hand Gauge under test. Refer to section 1.3 for specifications.

Section 7: Pro Check Hand Aneroid

7.1 Opening/Removing and Replacing Parts of Pro Check Hand Aneroid

1. Insert screwdriver at bottom of the crystal and pry out crystal.
2. Loosen and remove pointer using T105243A.
3. Insert screwdriver at bottom of the dial and remove the dial from the gauge.
4. Unscrew the complete base plate with the movement and remove the washer using T112833 movement removal tool.

<u>Reassemble in reverse order</u>(Ensure you tighten the movement down with Torque wrench T112653 using adapter T112653A)

* - See Section 8.7 for drawing of the Pro Check Hand Gauge

7.2 Calibration of the Pro Check Hand Aneroid

1. Obtain gage assembly, attach air supply with luer fitting
2. Position test dial and test pointer on gage.
3. Apply 300 mmHg pressure. View gauge and ensure the leak is no greater than 10 mmHg in 5 seconds.

SPAN ADJUSTMENT

From average "0" starting position, pressure gage to 320 then down to 300 mmHg. Note position and maintain pressure:

1. If span is too low - obtain tweezers or jewelers screwdriver and bend the adjustment pin away from pinion parallel to gear sector arm. Change pressure to 0, make sure to re-adjust the test dial so that the pointer will be slightly left of the graduation line. Re-pressurize to 320 then to 300 to evaluate effects of adjustment.
2. If span is too high - obtain tweezers or jewelers screwdriver and bend the adjustment pin towards the pinion parallel to the gear sector when pressurized at 300. Change pressure to 0, make sure to re-adjust the test dial so that the pointer will be slightly left of the graduation line. Re-pressurize to 320 then to 300 to evaluate effects of adjustment.
3. Repeat above steps as required to obtain correct span adjustment.

LINEARITY ADJUSTMENT - (As required) If 0 and 300 position are correct, and other points at 250, 200, 150, 100 or 60 are either too high or too low at one or more points, then perform the following adjustments.

HIGH GAGE READINGS - (Predominantly at 250 and 200)

1. Remove test pointer and test dial. Obtain calibration tool and position over adjusting pin down to cross shaft, (move gear sector with finger of other hand to allow access). Rotate pin to move hook away from diaphragm approx. 15 degrees. While maintaining this position, lift tool up from cross shaft approx. 1/16 inch and bend the pin back towards the operator approx. 15 degrees. Lift the calibration tool up to the point where the pin makes contact with the gear sector and bend the pin up, (away from operator) approx. 30 degrees.
2. Remove tool and release gear sector. The resultant bend should result in the gear sector starting position being a max. of 2 teeth extending beyond the top plate when viewed from a top position and a minimum of 2 teeth within the edge of the top plate. (This must be checked by pushing the gear sector 2 teeth from the other side of the top plate). Adjust secondary bend if gear sector is out of these limits. Re-assemble test dial and pointer, recheck span and adjust as necessary prior to inspection at intermediate points.

LOW GAGE READINGS - (Predominantly at 60 and 100)
1. Remove test pointer and test dial. Obtain calibration tool and position over adjusting pin down to cross shaft. Lift tool approx. 1/16 inch and bend the pin away from operator approx. 15 degrees. While maintaining this position, lift tool to point where pin makes contact with the gear sector. Bend the pin down or towards the operator approx. 30 degrees. Remove tool and release gear sector. Check for gear sector starting position as defined previously, adjust if necessary. Re-assemble test dial and pointer, recheck span and adjust as necessary prior to inspection at intermediate points.
NOTE: In all adjustments during calibration, the gear sector starting position will affect accuracy. Sometimes, this alone can be used as an individual adjustment to achieve conformance. Higher readings will be realized when the gear sector is extending beyond the edge of the top plate and lower readings will be realized when it is within the edge of the top plate.

- - See Section 8.9 for drawing of the S+K Movement.

7.3 Testing of the Pro Check Hand Aneroid

1. Hook up the Pro Check Hand Gauge that needs to be tested to the pneumatic tubing of the test equipment.
2. Apply 320 mmHg to the gauge.
3. Release the pressure to 300 mmHg on the digital pressure meter, or a calibrated aneroid or mercury gauge. ***Note:*** *The aneroid or mercury gauge must be accurate to +/- 3 mmHg at the stated target pressures using a calibrated digital pressure meter. If using a calibrated aneroid or mercury column the accuracy must be +/- 6 mmHg.*
4. Check reading of the pressure meter or gauge to that of the Pro Check Hand Gauge under test. Refer to section 1.3 for specifications.

Section 8: Pictures and Replacement Parts

Section 8.1: Classic Pocket Aneroid Replacement Parts

The following are the list of replacement parts for the Pocket Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	**Description**
51P52	Clip Assembly
2P1623	Case
32P180	Lock nut
34P760	Crystal
3P831	Bezel
35P804	Screw cap (NS)
61S681	Diaphragm Assembly
63S401	Pointer
93S617	Movement
9P1799	Screw, Movement
11P363	Spring
7P689	Pin for Clip

Section 8.2: Classic Hand Aneroid Replacement Parts

The following are the list of replacement parts for the Classic Hand Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	Description		Part Number	Description
12P368	Lure Lock Fitting		2P1628	Cover, Hand Gauge
9P2651	Screw, Cover		3P831	Bezel
9S132	Thumb Screw		34P760	Crystal
42P252	Valve Body Assembly		63S401	Pointer
5090-30	Screen Assy/Bulb Adapter		9P1799	Screw, Movement
12P490	Bulb Adapter		93S617	Movement
2P1627A	Case		61S694	Diaphragm Assembly
5086-01	Bulb		32P527	Lock Nut

Section 8.3: 767 Wall/Mobile Aneroid Replacement Parts

The following are the list of replacement parts for the 767 Wall/Mobile Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	**Description**
3P844	Bezel
34P768	Crystal
63S412	Pointer
93S617A	Movement
61S681	Diaphragm Assembly
2P1138	Mount
32P727	Nut
2P1631	Case
32P763	Lock nut, Case - *Not pictured*
8P1064	Bushing - *Not pictured*
96P135	Basket - *Not pictured*
9P2841	Dial Mounting Screw

Section 8.4: Classic Wall/Mobile Aneroid Replacement Parts

The following are the list of replacement parts for the Classic Wall/Mobile Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	**Description**		**Part number**	**Description**
2P1138	Mount		34P417	Crystal
9P1804	Spacer		9P2841	Dial Mounting Screw
61S681	Diaphragm Assembly		63S298	Pointer, USA
32P727	Jam Nut		63S402	Pointer, Japan - *Not pictured*
14P1718	Bracket		2P1503	Case (Gray)
9P2455	Bracket Screw		2P1124	Case (Beige) - Not pictured
8P949	Bracket Bushing		9P2465	Screw (Case)
32P763	Bracket Nut		22P830	Washer (Case)
93S617A	Movement			

Section 8.5: Economy Aneroid Replacement Parts

The following are the list of replacement parts for the Economy Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	**Description**
2P1437	Cover for Economy Aneroid
2P1626C	Case for Economy Aneroid
34P640	Crystal
93S618	Movement
2P1130D	Clip
32P727	Jam Nut
63S401	Pointer
9P2563	Screw (Case)
61S693	Capsule
9P1799	Screw, Movement

Section 8.6: Silver Ring Hand Aneroid Replacement Parts

The following are the list of replacement parts for the Silver Ring Hand Aneroid Gauge that can be purchased through Welch Allyn Inc.

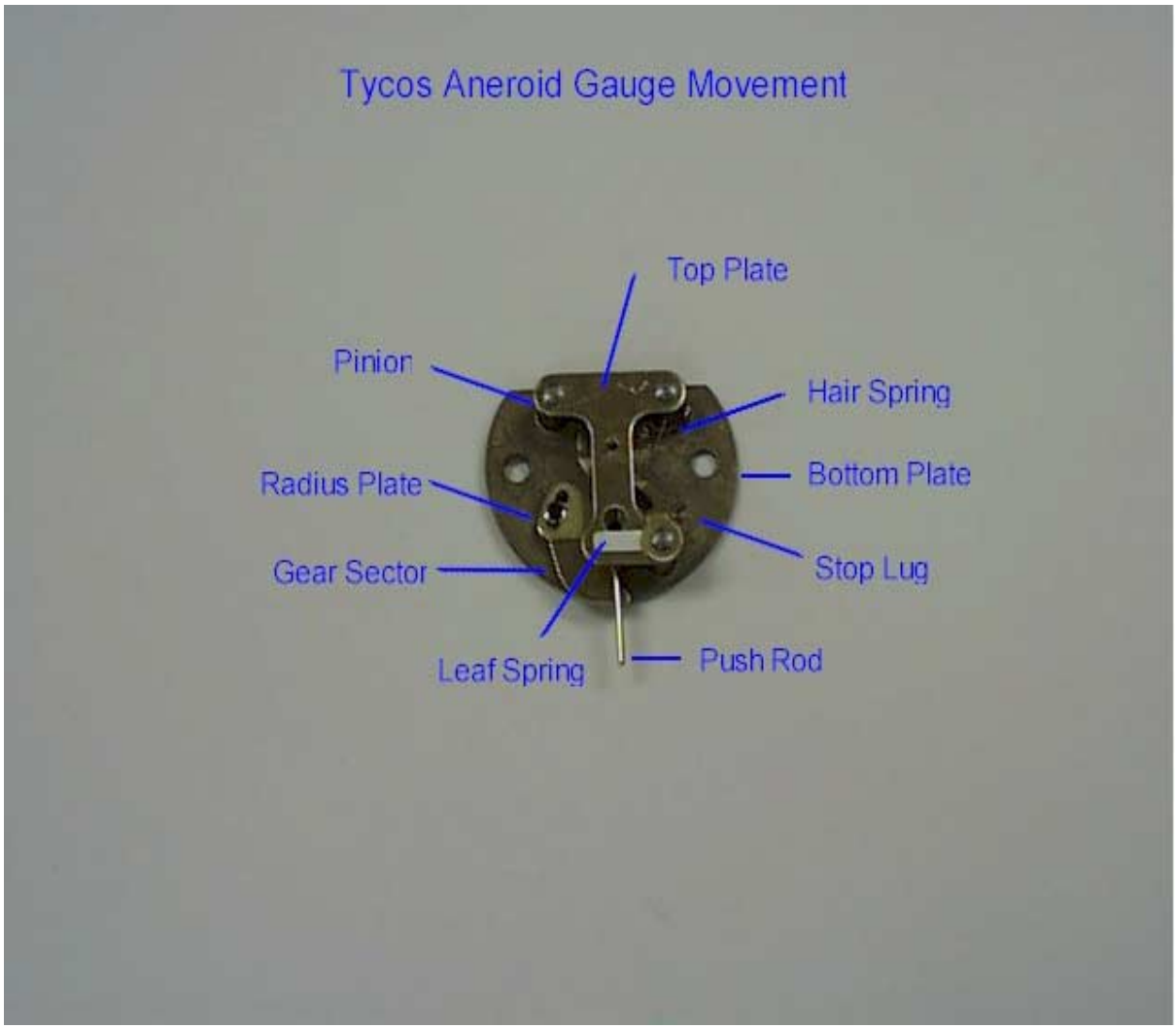
Part Number	Description		Part Number	Description
12P368	Adapter		52P1848	Dial
75P240	O-Ring		18P189	Bulb Collar
2P1632	Housing		23P428	Bulb Adapter
33P131	Movement Cup		97S581	Bulb
70P450	Button		11P1240	Spring
7P716	Pivot Pin		42S242	Valve Body
93S720	Movement		8S61	Valve Assembly
22P1455	Washer Silicon		5090-30	Screen Assy/Bulb Adapter
34P434	Crystal		3P847	Bezel
39P505	Trim Ring		63S410	Pointer

Section 8.7: Pro Check Hand Aneroid Replacement Parts

The following are the list of replacement parts for the Silver Ring Hand Aneroid Gauge that can be purchased through Welch Allyn Inc.

Part Number	**Description**
34P761	Crystal
63S416	Pointer
52P1845	Dial
93S720	Movement
22P1460	Washer
97S583	Bulb
18P190	Bulb Ring
70P446	Trigger
8S61	Valve Assy
11P1240	Spring - *Not pictured*
52-09-950	*Housing (order from S+K)*
15-40-000	*Valve Body (order from S+K)*

Section 8.8: Welch Allyn Tycos Movement



Section 8.9: Welch Allyn S+K Movement